

Delete all guidelines under each heading once you have completed your Project Report

PROJECT TITLE: ...

SUBTITLE *(if applicable)* ...

First Name(s):

Surname:

Category:

Sub-category:

Province and Region:

School:

Grade:

(Cover page: All project reports must have a cover page with the above details)

This is guide and template on how to write an engineering type project report to bring to the Eskom Expo for Young Scientists' fair. It gives detailed instructions, that you need to read and follow. Ask your teacher/Regional Science Fair Director if you do not understand any part of this section of the report guide.

Pages should have 2.5-cm margins. It is preferable to use 12-point Sans-serif fonts that are easy on the eyes, i.e. Gill Sans MT, Times New Roman. Use 1.5-line spacing. Include page numbers on the bottom centre or right corner of each page. Spelling, grammar usage and punctuation should conform to the Oxford English Dictionary for UK English (not US English).

Paragraphs are useful tools for separating and organising your ideas. Different ideas should be split into separate paragraphs and common ideas should be grouped in the same paragraph. Your paragraph should have a topic sentence which gives the reader an indication of what to expect in that paragraph. If you present two hypotheses/engineering goals in the Introduction, then you should deal with those hypotheses/goals in the same order in the Methods, Results, and Discussion sections.

Abbreviations

Use abbreviations sparingly and only if they will save substantial redundancy throughout your project report. Adding abbreviations (particularly abbreviations that are common in your choice of category) can make your writing more concise, but overuse simply adds confusion. Be sure to define abbreviations in full at first use by writing out the term in full, and then placing the abbreviation in parentheses; e.g., basal metabolic rate

Scientific names of organisms

All organisms have common and scientific names and must be both named at first mention e.g. "African Lion (*Panthera leo*) specialising on marine diet..." You then choose which one to use and be consistent throughout the report. If you choose to use the scientific name, at first mention, the scientific name of the species must be written in full, and italicised and when mentioned subsequently you must use the first letter of the genus followed by a full stop, followed by species name e.g. "Behavioural characteristics of *P. leo* make..." Never start a sentence with an abbreviated scientific name. The genus name always starts with a capital letter and species name is in small letters. If you are discussing organisms of more than one genera which share a common initial letter, you need to always write the full names to avoid confusion e.g. "*Panthera leo* and *Puma concolor* exhibit similar..." Plant names also follow the binomial nomenclature, however, in plants, you can also get subspecies (subsp.) and within subspecies, we get varis (var.). For example, the umbrella thorn acacia (*Vachellia tortilis*) has four subspecies, and these must be written like this: *Vachellia tortilis* subsp. *heteracantha*; *Vachellia tortilis* subsp. *raddiana*; *Vachellia tortilis* subsp. *spirocarpa*; *Vachellia tortilis* subsp. *tortilis* – notice 'subsp.' is not italicised. There are two varieties of *Vachellia tortilis* subsp. *raddiana* and these must be written like this: *Vachellia tortilis* subsp. *raddiana* var. *pubescens*; *Vachellia tortilis* subsp. *raddiana* var. *raddiana* – notice 'var.' is also not italicised.

Numbers

Write out numbers smaller than 10 in letters and use numerals for numbers 10 and more. However, use numerals only when numbers are being compared e.g., "We captured 3, 7, 14, and 17 bats on subsequent nights" or if the numerals are accompanied by units of measurement e.g. "3 kg, 9 cm". In addition, do not start a sentence with a number.

Tables and figures

Tables must have a title (above the table) and figures must be accompanied by a caption (below the figure). Both tables and figures must be referred to in the text. Thus, provide a brief description of the data and the column headings, and be sure to explain any abbreviations you use. When planning your figures, begin by deciding what the figure should look like. Normally, one places the independent variable (i.e., perceived to be causing the relationship) on the X-axis and the dependent or response variable (i.e., perceived to be affected by the independent variable) on the Y-axis.

If both variables are continuous (e.g. measurements, counts, time), a line graph is appropriate.

If the X-axis is categorical (e.g. male/female, juvenile/yearling/adult, low/medium/high treatments of an experiment), then a bar graph is appropriate.

Each graph should have values along the X and Y axes, clear labels for each axis (with units), and a complete description below it

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Introduction

In the introduction, present a brief overview sufficient enough to establish the need for your research project. It sets the project in its broader context and narrows it down by identifying and explaining the motivation of the project. It ranges between two to four pages. Never put your findings or decisions in the Introduction.

Literature Review

Briefly review relevant literature (e.g. journal articles, books, technical reports, etc.) to orientate the reader. You present an overview of what is known about the research project. In doing so, you will read previous and recent research done around your project and write what is most relevant to it. As you near the end of the literature review (i.e., at the beginning of the last paragraph), identify the important gap that you are trying to fill. You need to build up to why you are doing this research project.

Problem Statement

Based on the gaps/ knowledge you found in the literature review, clearly write either a problem statement or phenomena. Give a basic statement of the problem or explain the importance of the phenomena.

Aim

State your aim clearly and concisely.

Research Question or Hypothesis

Clearly state the research question you want to answer or your hypothesis

Method

The method section describes **what** you did, **why** you did it and **how** you did it. This section must explicitly explain how you went about testing the hypothesis, solving the problem or understanding the phenomena. Describe your methods in enough detail so someone else could replicate your project. In other words, anyone should be able to follow your methods to verify or refute what you found. Briefly explain the rationale for the measures you made. This section is written in the past tense.

Variables

List your variables.

Materials

List the materials and apparatus you used for your project. Don't mention brand names.

Experimental design

In this section, you need to describe your experimental design. Include descriptions of all treatments and variables and provide the number of replicates you used. Identify each treatment using a descriptive name (e.g. Temperature at 35°C), rather than generic names or numbers (e.g., Treatment 1). Make sure that the experimental conditions are adequately described. Tables are often useful for describing the experimental design and flow diagrams for sequential protocols. Among the details to be included in this section, most important are the quantitative aspects of your study (e.g., masses, volumes, incubation times, concentrations in lab experiments, etc.). Avoid using brand names when doing your project. Instead, use generic names e.g. the sugar levels between brand 1 and 2 were compared.

Results

The overall purpose is to describe patterns, not to explain or interpret them. Think of the Results section as telling a story about what you found when conducting your tests. Start with a basic summary of the data, not statistical results. For example, - We caught a total of 50 rodents over 10 trap days for an overall trapping rate of 25%. Of these 50 rodents, 19 were females and 31 were male. You might also provide basic natural history data relevant to your study, how they might have changed over time, or how they differed between treatments/study areas. You need to set the context within which the data was collected. That will help the reader to understand the data more fully.

Results should be presented in a way that it aligns with the hypothesis/research questions. Begin by thinking about what information the reader will need to assess whether you achieved your aim or not. It should be presented in a form that is easy to read, which usually means putting it in a graph or a table.

Discussion

The discussion interprets patterns you found. Explain why you found what you found, backing it up with relevant literature. This is done by reviewing and comparing literature. Literature used must be cited and referenced ([see referencing guide, Appendix J](#)). How are they similar or different? Why might there be differences between your research and others?

It explains what the patterns mean (i.e., why you found the results you did). The discussion is an important part of your project and must be substantive.

Limitations and errors

Briefly describe any errors in your testing that may have influenced your overall results. What were the limiting factors?

Recommendations for Future Research

Make concrete suggestions about how this project could be extended.

Conclusion

Clearly state your conclusion and importantly, be sure to address the importance of your work. Write your conclusions to address one all-important question: - So what? What is the overall importance of the results? Why should anyone care? You must refer to the hypothesis and to the most important results and you must state whether your hypothesis is supported or rejected.

Acknowledgments

Any person who made a direct contribution to the study should be acknowledged. If applicable, funding sources should be mentioned.

References

Referencing is a way to validate that you have done further reading, learning and comprehension by using relevant sources. Eskom Expo for Young Scientists uses the Harvard format for referencing. Formatting has to be consistent throughout the report.

Appendix

An appendix is placed at the end of your report, because the full version is either inappropriate or too detailed for the body of the report. There may be more than one appendix, in which case the series is called the appendices. When you mention the content in your appendix, you must name it in the text, e.g. Appendix 5.